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DD/S.T-593-66

25 January 1966

MEMORANDUM FOR: Dr. Wheelon

SUBJECT: Translation of Soviet Article entitled
"Mammoths and a Climatic Paradox"

As your expert on mammoths and ice ages, I have the following comments concerning the translation of the Soviet article sent to us by the Director of Scientific and Technical Intelligence in Ottawa:

a. The article contains some interesting speculation concerning the effects of the flow of the Gulf Stream in the Arctic Ocean and possible changes in the Soviet climate that could be induced by cutting a channel through the Chesha Peninsula. The author's case, however, depends in part on some questionable deductions concerning the immediate post-glacial period. If you wish, you can stop reading here. If you wish to pursue the matter further, however, I have made additional points below to support this generalization.

b. The author deduces from an examination of the remains of mammoths found in permafrost in Siberia that there was a period of approximately two thousand years after the conclusion of the last period of glaciation during which the Soviet Arctic enjoyed warmer weather than is the case today. He argues that this favorable weather was the result of the influence of the Gulf Stream which flowed along the Arctic coast of Siberia. He blames the end of the good weather on the silting up of the channel through the Chesha Peninsula, which changed the flow of currents out of the White Sea and blocked the progress of the Gulf Stream along the Siberian coast. He feels that if this channel could be reopened, the Gulf Stream would be able to follow its former course and create a more favorable climate in the Soviet Arctic.

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c. The most widely accepted theory concerning the glaciation of the Northern Hemisphere is as follows. Warm water from the Atlantic flows into the Arctic Ocean between Greenland and Norway causing ice in the Arctic Ocean to melt. Open water in the Arctic Ocean results in increased evaporation in the Northern Hemisphere which falls on land in northern latitudes in the form of snow. Once the fall of snow is so heavy that it cannot melt off in the summer, it results in the accumulation of ice which eventually forms glaciers. As larger and larger amounts of water are locked up on land in the form of ice, the level of the ocean drops. As the level of the ocean drops, and the flow of warm water into the Arctic Ocean has been reduced beyond a certain point, the Arctic Ocean begins to freeze. Once the Arctic Ocean is frozen, evaporation is reduced and there is a comparable reduction in the fall of snow on land. Eventually the snow fall decreases to the point at which the ice melts faster during the summer than it can be built up during the winter. This results in a gradual melting of the glaciers with a consequent rise in the ocean level. Eventually the ocean rises to the point at which warm Atlantic water can flow freely into the Arctic, and the cycle begins again. The entire process may take many thousands of years to complete, and there are many variations in the speed with which the various processes take place.

d. There is fairly good evidence, based on Carbon 14 dating, to place the beginning of the decline of the last period of glaciation at about eleven thousand years ago. The warming trend has not been uniform throughout this period, but in general there has been a major retreat of the ice and resulting rise in sea level during this period. Some scholars speculate that we are nearing the end of the warming trend and that possibly within the next few hundred years we may enter the beginning of a new period of glaciation. If this dynamic theory of glaciation is reasonably close to reality, one would expect that the Siberian shore of the Arctic Ocean would have been relatively ice-free during the period at the end of and immediately following the end of the height of glaciation. As the process continued, there would have been an increase in ice along the shore and a consequent decrease in climatic conditions in its immediate vicinity.

e. The author presents no evidence concerning the time at which the channel through the Chesha Peninsula was silted up. For that matter, he doesn't really present any firm evidence that there really was such a channel. If there was a channel and if it did silt up at about the time suggested by the author, it might well have had the effect on the Gulf Stream that he suggests. On the other hand, it seems clear that the climatic conditions affecting the mammoths can be accounted for within the framework of the dynamic theory of glaciation without involving the more local effects of the Chesha Channel. It would be somewhat difficult to prove that the effects of cutting a channel through the Peninsula could be as great as the author suggests.


William A. Tidwell

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cc: Dr. Chamberlain